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ABSTRACT

The following course outline has been prepared as a guide toward helping the student develop an understanding of operating principles and procedures necessary in processing data electronically. Students who have met the objectives of Designing the Computer Program should be admitted to this course. The class meets 2 hours per day for 90 clock hours. The course outline lists the information the student must learn. It is made up of 12 blocks of instruction (orientation, operating the central processor, peripheral units operation, file processing techniques, payroll application, validation of transactions, sort transactions, master file update run, payroll check print run, payroll reports run, employee responsibilities, and a Quinmester posttest) which are further broken down into several units each. Included are the course goals, specific block objectives, a course outline, a 12-item bibliography, and an appendix of Quinmester posttest samples and answer keys.
(Author/BP)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE

QUINMESTER PROGRAM

DADE COUNTY PUBLIC SCHOOLS



V-15

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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Course Outline
DATA PROCESSING TECHNOLOGY - 8025
(Programming and Operations Lab I - Intermediate)
Department 73 - Quin 8025.23

DIVISION OF INSTRUCTION • 1973

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DADE COUNTY PUBLIC SCHOOLS

1450 NORTHEAST SECOND AVENUE

MIAMI, FLORIDA 33132

Course Outline

DATA PROCESSING TECHNOLOGY - 8025
(Programming and Operations Lab I - Intermediate)

Department 73 - Quin 8025.23

county office of
VOCATIONAL AND ADULT EDUCATION

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Miami, Florida 33132

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Course Description

<u>8025</u>	<u>73</u>	<u>Quin 8025.03</u>	<u>Programming and Operations</u>
<u>State Category</u>	<u>County Dept.</u>	<u>County Course</u>	<u>Lab I - Intermediate</u>
<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Course Title</u>

Using the skills and knowledge obtained from Computer Communications and Operations, and Designing the Computer Program, the students will develop programs. Operating principles will be studied further and applied while testing and debugging programs. Payroll processing is used to present the students with programming problems and responsibilities of both programmers and operators.

Indicators of Success: The student must have met the objectives of Designing the Computer Program prior to enrollment in this course.

Clock Hours: 90

PREFACE

The following course outline has been prepared as a guide toward helping the student develop an understanding of operating principles and procedures necessary in processing data electronically. Programming techniques that are commonly practiced are presented to the student along with problems he can more readily identify and work with in applying various techniques.

The student has the opportunity to develop programs complete with documentation, flowcharts, coding and operator instructions. The ability to follow directions is cultivated throughout this course and an effort is made to arouse in the student a feeling of confidence in making decisions as to file layouts needed and print formats used in reporting. The student must have enough confidence in himself to be able to make decisions in flowcharting, coding and operating the equipment if he is to be a success in this field.

Through solving problems connected with payroll processing, the student will be able to develop his skill in working with program instructions and will be given the opportunity to increase his vocabulary to include terms common to both payroll processing and the data processing field. Although it is usually unnecessary for a programmer, on the job, to write a payroll system of programs, this application provides the student with the opportunity to practice mathematical computations, make decisions, establish controls, design forms and apply file processing techniques. The skills and understanding gained from this practice will provide the student with the knowledge necessary to modify an existing payroll program in a future job.

This elective course is one of a series designed for quinmester use. Students who have met the objective of Designing the Computer Program

should be admitted to this course.

The class meets two hours per day for 90 clock hours. The outline lists the information the student must learn. It is made up of 12 blocks of instruction which are further broken down into several units each.

In presenting the material outlined in this course, the instructor uses lectures, presentation, student participation, demonstration and student projects as methods of instruction. After instruction and practice on the application that has been studied, evaluation of the student's skill and understanding is made.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee, and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

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GOALS

The student must be able to demonstrate:

1. The ability to follow proper operating procedures.
2. The ability to interpret written instructions.
3. An understanding of the need for proper documentation when preparing programs.
4. The ability to develop logical solutions to programming problems of a simple nature.
5. A knowledge and understanding of various terms commonly used in the data processing field.
6. A knowledge and understanding of operating problems and their solutions.
7. The ability to access a file, manipulate data and print a report in a presentable format, through programming.
8. An understanding of the programming techniques used in problem solving.
9. A basic understanding of file processing techniques in data processing.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student must be able to:

1. Explain orally or in writing, the requirements of this course.
2. Demonstrate an understanding of the safety regulations he must observe by writing an explanation of each regulation.
3. Explain orally or in writing, the student benefits to be derived from this course.

BLOCK II - OPERATING THE CENTRAL PROCESSOR

The student must be able to:

1. Exhibit the ability to follow the correct procedures in central processor operation.
2. Exhibit the ability to recognize and correct error conditions that may occur while operating the central processor.
3. Describe in writing the purpose of the memory registers and how an operator uses them.

BLOCK III - PERIPHERAL UNITS OPERATION

The student must be able to:

1. Demonstrate a knowledge and understanding of operating procedures necessary for each peripheral unit by an oral or written report.
2. Exhibit the ability to recognize and handle correctly errors that may occur while operating the peripheral units.

BLOCK IV - FILE PROCESSING TECHNIQUES

The student must be able to:

1. Explain orally or in writing the types of files and methods of organization utilized in processing
2. Demonstrate a knowledge and understanding of the various types of processing methods available by writing an explanation of each method.

BLOCK V - PAYROLL APPLICATION

The student must be able to:

1. Explain orally or in writing the factors which must be considered when computing a payroll for both hourly and salaried personnel.
2. Demonstrate an understanding of the records which must be maintained and their importance, by writing a brief explanation of each one studied.
3. Explain in writing the various types of reports that are required in payroll systems.

BLOCK VI - VALIDATION OF TRANSACTIONS

The student must be able to:

1. Explain orally or in writing the methods used to validate records.
2. Identify invalid items existing in an input transaction file.
3. Explain orally or in writing the need for control procedures in validation operations.

BLOCK VII - SORT TRANSACTIONS

The student must be able to:

1. Explain in writing the function of a sort generator.
2. Demonstrate an understanding of the problems which must be taken into consideration when planning a sort operation, by an oral or written report.

BLOCK VIII - MASTER FILE UPDATE RUN

The student must be able to:

1. State in writing the requirements of input/output files to update a master file.
2. Demonstrate a knowledge and understanding of the necessity for accumulating the proper totals and establishing proper controls by preparing an oral or written report.

BLOCK IX - PAYROLL CHECK PRINT RUN

The student must be able to:

1. Explain orally or in writing the importance of establishing an effective method of number control.
2. Explain orally or in writing the precautions a programmer may take to assure proper alignment of continuous form checks.

BLOCK X - PAYROLL REPORTS RUN

The student must be able to:

1. Demonstrate an understanding of methods a programmer may use to sequence reports by writing an explanation of at least two methods.
2. Exhibit the ability to plan the format of at least two types of reports.

BLOCK XI - EMPLOYEE RESPONSIBILITIES

The student should be able to:

1. Demonstrate a knowledge and understanding of the desired attitudes and ethics of both the computer operator and programmer by writing an explanation of these traits.

2. Explain orally or in writing the duties of both the programmer and computer operator that require them to record meaningful information.

BLOCK XII - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

DATA PROCESSING TECHNOLOGY - 8025 (Programming and Operations Lab I - Intermediate)

Department 73 - Quin 8025.23

I. ORIENTATION

- A. Objectives of the Course
 - 1. Requirements
 - 2. Methods of evaluation
 - 3. Teaching methods
- B. Student Responsibilities
 - 1. Care of equipment
 - 2. Use of materials
 - 3. Safety regulations
 - 4. Class absences
- C. Student Benefits
 - 1. Self esteem
 - 2. Individual development of skills
 - 3. Employability

II. OPERATING THE CENTRAL PROCESSOR

- A. Following Instructions
 - 1. Program name
 - 2. I/O devices used
 - 3. Dating
 - a. Virtual
 - b. Actual
 - 4. File names
 - 5. Program halts
- B. Error Conditions
 - 1. Parity error
 - 2. Program error
 - 3. Not ready lights
 - 4. Closed loops
- C. Operator Logs
- D. Memory Registers
 - 1. Read
 - 2. Write
 - 3. Address

III. PERIPHERAL UNITS OPERATION

- A. Card Reader
 - 1. Load program

2. Validity check
 3. End of file
 4. Load data file
 5. Card jams
- B. Paper Tape Reader
1. Loading program
 2. Parity errors
 3. End of tape
- C. Magnetic Tape Units
1. Loading program
 2. Unit designation
 3. End of file
 4. End of tape
 5. Labels
 6. Read/write errors
 7. File protection
- D. Magnetic Disk Units
1. Loading program
 2. Unit designation
 3. File protection
 4. Labels
- E. Line Printer
1. Load forms
 2. Control tape/vertical spacing
 3. Slewing/skipping
 4. Horizontal control
 5. Ribbon
 6. Out of paper
- F. Card Punch
1. Setup procedure
 2. Card jams
 3. Errors

IV. FILE PROCESSING TECHNIQUES

- A. Transaction Files
1. Definition
 2. Use
- B. Master Files
1. Definition
 2. Use
- C. File Organizational Methods
1. Sequential organization
 2. Indexed sequential organization
 3. Random organization

IV. FILE PROCESSING TECHNIQUES (Contd.)

D. Processing Methods

1. Sequential processing
 - a. Sequential/sequential
 - b. Selective/sequential
 - c. Indexed/sequential
2. Random processing
 - a. Random/sequential
 - b. Random/random

V. PAYROLL APPLICATION

A. Hourly Paid Employees

1. Computation of hours worked
 - a. Length of field
 - b. Overtime hours
 - c. Regular hours
 - d. Decimal point location
 - e. Holiday
2. Computation of earnings
 - a. Regular earnings
 - b. Overtime earnings
 - c. Other pay
 - d. Gross earnings
3. Deductions
 - a. Standard deductions
 - (1) FICA
 - (2) Withholding Tax
 - b. Miscellaneous deductions
 - (1) Insurance
 - (2) Credit Union
 - (3) Union dues
 - (4) Others
4. Net pay

B. Salaried Personnel

1. Computation of hours
2. Computation of earnings
3. Deductions
4. Net pay

C. Employee Earnings Records

1. Period ending/date paid
2. Quarterly totals
3. Year-to-date totals
4. Employee identification

D. Payroll Journal

1. Purpose
2. Contents
3. Balancing

- E. Printing Payroll Checks
 - 1. Voucher requirements
 - 2. Check numbers
 - 3. Payee
 - 4. Amount protection
 - 5. Audit control

- F. Payroll Reports
 - 1. New employees
 - 2. Terminations
 - 3. Changes
 - a. Exemptions
 - b. Pay rate
 - c. Miscellaneous
 - 4. Quarterly/annual

- G. Labor Distribution
 - 1. Direct labor
 - 2. Indirect labor

VI. VALIDATION OF TRANSACTIONS

- A. Numeric Fields
 - 1. Illegal characters
 - 2. Range of numbers allowed
- B. Alphabetic Fields
 - 1. Illegal characters
 - 2. Range allowed
- C. Invalid Items
 - 1. Identification
 - 2. Count
- D. Valid Items
 - 1. Output file
 - 2. Count
- E. Audit Trail
 - 1. Purpose
 - 2. Methods

VII. SORT TRANSACTIONS

- A. Sort Generator
 - 1. Parameter sheets
 - 2. Control key
 - (a) Major
 - (b) Minor
- B. Sorting Problems
 - 1. Complexity of programming
 - 2. Required equipment

VIII. MASTER FILE UPDATE RUN

- A. Input/Output Requirements**
 - 1. Transactions
 - 2. Master file
 - 3. Journal
 - 4. Report/check file
- B. Totals Accumulated**
 - 1. Department totals
 - 2. Grand totals
- C. Balancing Payroll**
 - 1. Hours
 - 2. Gross wages
 - 3. Deductions
 - 4. Net pay
- D. Balancing Master File**
 - 1. Number records
 - 2. Proof total
 - 3. To-date totals

IX. PAYROLL CHECK PRINT RUN

- A. Number Control**
 - 1. Preprinted numbers
 - 2. Unnumbered checks
- B. Continuous Checks**
 - 1. Check alignment
 - 2. Vertical control loop

X. PAYROLL REPORTS RUN

- A. Sequence**
- B. Format**

XI. EMPLOYEE RESPONSIBILITIES

- A. As a Programmer**
 - 1. Attitudes
 - 2. Ethics
 - 3. Documentation
 - 4. Communication
- B. As an Operator**
 - 1. Attitudes
 - 2. Ethics
 - 3. Record maintenance
 - 4. Equipment malfunctions

XII. QUINMESTER POST-TEST

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Quinnmester Post-test Sample

Quinnmester Post-Test

Name _____ Date _____ Score _____

True-False Test Items

Each of the following statements is either true or false. If the statement is true, draw a circle around the letter T following it; if the statement is false, draw a circle around the F. If a statement is false in part, it is entirely false.

-
- | | |
|---|-----|
| 1. The computer operator is responsible for running the system with the proper dates. | T F |
| 2. If one person is a capable operator, anyone should be a capable operator. | T F |
| 3. When the operator makes a mistake and forgets to load forms in the printer, a not ready light will be lit on the central processor | T F |
| 4. Memory registers can be used to find out what is in a certain location in memory. | T F |
| 5. Parity is a system used to indicate when the wrong data has been entered by the operator. | T F |
| 6. An end of page signal is emitted when the printer runs out of paper | T F |
| 7. It is extremely important for the operator to follow the instructions provided for the program being run. | T F |
| 8. Magnetic tape units and magnetic disk units have unit designators that can be changed to different numbers. | T F |
| 9. A transaction file is used to update a master file. | T F |
| 10. An operator log is used to record the time a program is started, finished and any problem that occurred during the run. | T F |
| 11. The printer spacing is controlled by program instruction. | T F |
| 12. Forms used in the printer may be of different widths. | T F |

Multiple Choice Test Items

Each statement needs a word, a figure, or a phrase to make it correct. Only one of the choices listed is correct. Place the letter of the choice you make in the space provided at the left.

- ___ 1. The term used to express the rate at which file additions and deletions occur is:
 - a. Activity
 - b. Volatility
 - c. Relativity
 - d. Creativity
 - e. Utility
- ___ 2. Batch processing is another term for:
 - a. Sequential processing
 - b. Random processing
 - c. Random/sequential processing
 - d. Random/random processing
 - e. File processing
- ___ 3. The smallest subdivision of a file is the:
 - a. Section
 - b. Bucket
 - c. Record
 - d. Character
 - e. Field
- ___ 4. The largest subdivision of a file is the:
 - a. Section
 - b. Bucket
 - c. Record
 - d. Character
 - e. Field
- ___ 5. The final record in a file will be an:
 - a. End-of-record
 - b. End-of-tape
 - c. End-of-bucket
 - d. End-of-group
 - e. End-of-File

Listed below are definitions for various terms used in data processing. Read each definition carefully and write the term defined in the space provided.

1. The identification of a unique storage location in the computer system that is permanently assigned by the machine designer. _____
2. The time required to begin and complete the read and write function of a specified block of data. _____

3. A temporary storage device used to compensate for a difference in rate of flow of data or time of occurrence of events when transmitting data from one device to another. _____
4. To depart from the normal sequence of executing instructions in a computer. _____
5. The quantity or message that will be present in the computer and available as data throughout a program. _____
6. A file designated to receive information that is output from a computer run. _____
7. To modify the form or format of data. To insert or delete characters such as decimal points, commas or spaces. _____
8. A predetermined arrangement of characters, fields, lines and punctuation marks. _____
9. The data to be processed. _____
10. The field by which a file of records is sorted into order. _____
11. A method used to determine if hardware has correctly sent and received data characters. _____
12. A set of instructions arranged in proper sequence to direct the computer to perform a desired operation. _____

Essay Questions

The following questions require descriptive answers. Think carefully before answering each question. Place your answers in the space provided.

1. Why is it important to maintain an audit trail?

2. What is the purpose of a validation program?

3. What is the advantage of using prenumbered checks for payroll?

4. Why is documentation necessary?

5. In what ways can a programmer practice good ethics?

6. Why should an operator be conscientious in maintaining the operator log?

7. Explain the difference between the virtual date and the actual date as it applies to data processing.

8. What can the programmer do to aid the operator in the correct alignment of preprinted forms such as checks?

ANSWER KEY TO QUINMESTER POST-TEST

True-False Test Items

1. T
2. F
3. F
4. T
5. F
6. F
7. T
8. T
9. T
10. T
11. T
12. T

Multiple Choice Test Items

1. b
2. a
3. d
4. b
5. e

Completion Test Items

- | | |
|---------------------|-------------|
| 1. Absolute address | 7. Edit |
| 2. Access time | 8. Format |
| 3. Buffer | 9. Input |
| 4. Branch | 10. Key |
| 5. Constant | 11. Parity |
| 6. Destination file | 12. Routine |

Essay Questions

1. A transaction can become "lost" in processing. When an error exists in balancing it is possible to locate item for correction if an audit trail has been maintained. It is possible to prove the disposition of any or all items in a system with an adequate audit trail.
2. The validation run is used to make sure all fields are in the proper format with the proper type characters. Codes are verified as legal. This is to prevent processing of transactions with obvious errors.
3. Prenumbered checks make it easier to account for each check used. In the event checks are stolen, the theft would be discovered earlier. Account reconciliation is not complicated by duplication of numbers as is possible with unnumbered checks. It is also easier to recognize reorder points.
4. Proper documentation provides an explanation of the system for management. It can be used to train personnel when needed. It is an efficient way of eliminating the need for repetitious questions. It assures the procedures will be the same regardless of the person in charge.
5. A programmer is honor bound to have the best interest of his employer at heart. He should not say a program is ready to run when he is not certain that it is ready. He should prepare proper documentation to enable smooth operation in his absence rather than trying to become indispensable by withholding information. Job security is best gained by ability and performance rather than unethical practices.
6. The operator log can be a valuable aid in analyzing the overall operating system. Time studies may be accomplished with the aid of the log. Problems during a run may be the cause of a problem at the end of the system of runs and if not recorded, may cause unnecessary delay in finding the solution. Equipment failure interrupts the operating and work must be postponed. The next operator will know where the system must be re-started.
7. Virtual date is the date of the work being processed while the actual date is the date the work is processed. Today is the actual date but the transactions being posted are yesterdays and so are run with a virtual date of yesterday.
8. The programmer can build into his program a routine to print a sample format and halt. This enables the operator to check the alignment and make adjustments necessary. The routine should allow the operator to test the alignment and make adjustments for an indefinite number of times.